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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/825,870	04/05/2001	Leonid Grigorian	052833-5004	3120

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EXAMINER

LISH, PETER J

ART UNIT	PAPER NUMBER
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1754

DATE MAILED: 02/10/2003

8

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/825,870

Applicant(s)

GRIGORIAN ET AL.

Examiner

Peter J Lish

Art Unit

1754

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 December 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Applicant's arguments with respect to claims 1-18 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4 and 6-7 are rejected under 35 U.S.C. 102(e) as being anticipated by Resasco et al. (USPN 6,333,016).

Resasco et al. teach a method of producing single-walled carbon nanotubes (SWNTs) via the chemical vapor deposition of a carbon-containing gas. Resasco discloses that a flow of carbon-containing gas, such as methane, optionally mixed with a carrier such as helium or argon (column 8, lines 10-22) is contacted with supported catalytic particles at a temperature between about 650 and 800 °C under sufficient pressure and time to grown SWNTs. The catalyst is preferably bimetallic and contains at least one metal from Group VIII and at least one metal from Group VIb. The Group VIII metal may be iron (column 16, lines 61-64). The support may be alumina (column 7, lines 58-62).

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 5 and 8-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Resasco et al.

Resasco et al. is applied as above. Regarding the use of bimetallic and multi-metallic catalysts, Resasco teaches that bimetallic catalysts containing at least one of a Group VIII metal, such as Fe or Co, and one of a Group VIb metal, such as Mo, have a synergism which makes them effective catalysts for the production of single-walled carbon nanotubes. Furthermore, a catalyst made up of more than one Group VIII metal and a single Group VIb metal is taught (column 7, lines 28-51). It therefore would be obvious to one of ordinary skill at the time of invention to choose either Fe or Co as the Group VIII metal and to choose Mo as the Group VIb metal.

Regarding claims 5, 10, and 14-16, Resasco teaches that the ratio of the Group VIII metal to the Group VIb metal is preferably from about 1:10 to about 15:1. Further, the total amount of bimetallic catalyst deposited on the support may vary widely, but is generally in an amount of from about 1% to about 20% of the total weight of the metallic catalytic particle (column 8, lines 1-5). Given the teaching of Resasco et al., it would have been obvious to one of ordinary skill at the time of invention to use the claimed ratios of the applicant. Additionally, the use of specific catalyst ratios is viewed to be the optimization of a known process, held to be obvious by *In re Boesch* (205 USPQ 215) unless significantly different and unexpected results are shown.

Art Unit: 1754

Regarding claim 8, Resasco does not teach a specific ratio of methane to carrier gas. However, he does state that the carbon-containing gas is in high concentration. Therefore, it would have been obvious to one of ordinary skill at the time of invention to use the gas composition ratio of the applicant. Additionally, the use of a specific gas mixture ratio is viewed to be the optimization of a known process, held to be obvious by *In re Boesch* (205 USPQ 215) unless significantly different and unexpected results are shown.

Regarding the diameters of the single-walled carbon nanotubes produced by this process. Resasco teaches that the diameter of SWNTs generally varies from 1 nm to 5 nm (column 2, lines 3-6). He does not state the specific diameters of the SWNTs produced by the process he teaches, however, he does disclose that they are single-walled. Thus SWNTs with diameters within the range of 1 nm to 5 nm are expected. Additionally, it is expected that the product of the process, as taught, will be identical to that claimed by the applicant.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter J Lish whose telephone number is 703-308-1772. The examiner can normally be reached on 9:00-6:00 Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 703-308-3837. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-305-9311 for After Final communications.

Application/Control Number: 09/825,870

Page 5

Art Unit: 1754

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

PL
January 31, 2003

A handwritten signature in black ink, appearing to read "Stuart L. Hendrickson", with a stylized flourish at the end.

STUART L. HENDRICKSON
PRIMARY EXAMINER